

concerned the “first rod set,” *i.e.*, the ion guide: (1) whether the prior art ion traps were relevant to the inventors’ discovery of collisional focusing in an ion guide; and (2) whether AB/Sciex was estopped from asserting that the “first rod set” embraced Micromass’s ion tunnel under the doctrine of equivalents because of the arguments made in the reexamination. Thermo removes the statements it cites from this context and even the immediate context of the depositions and briefs on which it relies.

Thermo cites snippets in a brief submitted by AB/Sciex stating that ion traps “were not relevant” and “an ion trap is a ‘very different device.’” Thermo Br. 55 (citing TA 235). However, Thermo ignores the section immediately preceding the quoted snippets, which makes clear what argument was being made. AB/Sciex was arguing that the inventors did not believe the prior art ring-end cap ion traps were material because they understood their invention to be an improved *ion guide*:

Prior to the invention of the ’736 patent, it was believed that an ion guide should be operated at a low pressure, typically 10^{-4} torr or less, to maximize the transmission of ions from the source to the mass filter . . .

Drs. Donald Douglas and John Barry French, the inventors of the ’736 patent, however, discovered that *increasing* the pressures in the **ion guide** caused an *increase* of ion transmission, thereby increasing the sensitivity of the mass spectrometer . . . Dr. Douglas has so testified: “**the 736 patent is about ion guides . . .**”

TA 233-34 (italics in original; bold added). The argument had nothing to do with whether a “mass filter” can trap ions.

Thermo also cites snippets of Dr. Douglas’s testimony in which he differentiated ion traps. Thermo Br. 55-56. However, Thermo ignores the contexts in which these

snippets appear, which clearly indicate that Dr. Douglas was differentiating ion traps from his improved ion guide, not a mass filter:¹⁹

Q: Okay. Do you agree that that distinguishes an ion trap from the invention that you disclosed in the '736 patent?

The Witness: It was two parts to the sentence. It says ions are trapped and stored for a period of time, which can be quite lengthy. *That's very different from the ion guide.*

* * *

Q: So, an *ion guide* that has some trapping would not be practicing the invention that you disclosed in the '736 patent?

The Witness: There's nothing in the 736 patent about trapping.

* * *

Q: And you agree with this principle statement that it distinguishes *the invention* from an ion trap that ions are stored for some period of time in the trap?

A: No, there's other differences, as well. There are other differences, as well.

Q: Okay, I realize there may be other differences, but do you agree that that one difference, in and of itself, *distinguishes the Schaaf article and ion trap from the invention* disclosed in the 736 patent?

A: Yeah. I mean you are asking me to make a legal decision. I can't comment on that. As a scientist, I would say trapping ions, and not trapping ions is a big difference.

TA 336 (emphasis added).

¹⁹ The specification of the '736 patent highlights the inventors' discovery as a manner of operating an ion guide to obtain improved ion transmission. *See, e.g.*, JA16, 1:42-49 ("The inventors have now discovered . . . when the gas pressure is increased in the region of the ion optic elements is increased . . . ion transmission is markedly increased."); JA17, 4:56-58 (contrasting the prior art: "However in the past, it has always been thought necessary to maintain a low pressure in the first vacuum chamber 30."); JA18, 5:41-46 ("applicants have determined that under appropriate operating conditions, increasing the gas pressure in the first vacuum chamber 30 . . . most unexpectedly caused a considerable increase in the . . . ion signal").

Thermo also argues that AB/Sciex's arguments and the testimony of Dr. Douglas in the Micromass litigation were a general disclaimer of all ion traps because AB/Sciex and Dr. Douglas knew of Dr. Douglas's '278 patent. Thermo Br. 56. This argument is nonsensical. The statements of AB/Sciex and Dr. Douglas were directed to the *prior art*. The '278 patent is not prior art. Moreover, the '278 patent does not even call the rod set that traps ions an "ion trap." It says that "the rods can be used as a trap" and, as so used, calls the device a "pre-trap," a "quadrupole trap," or a "mass filter." JA677, 4:25-26, 51, 54; JA679, 7:27; JA680, 10:7, 9. The term "ion trap," as such, is used exclusively to refer to the *conventional* ion trap that receives the ions from the rod set in the instrument described. *See, e.g.*, JA676, 1:15-18, 45-46, 60-61; JA676, 2:55-56; JA677, 4:50-51; JA678, 5:55-56. Linear ion traps simply were not at issue in the Micromass case.

Finally, Thermo also invokes the doctrine of collateral estoppel (issue preclusion) based on the Court's ruling in the Micromass case that AB/Sciex is estopped from asserting that the claims of the '736 patent cover "ion traps" under the doctrine of equivalents. Thermo divorces the words of the Court from their meaning, which is clear in context. The issue of estoppel arose from MDS's statements in the Request for Reexamination. The Court noted: "Micromass . . . argues that AB/Sciex, *in distinguishing the ion trap references during reexamination*, disclaimed coverage of any electrodes that are not rods." *Applera*, 204 F. Supp. 2d at 773 (JA578) (emphasis added). Thus, the "ion traps" at issue before the Court were the same prior art ring-end cap ion traps that were before the Patent Office, not mass filtering rod sets that trap ions. The Court made it clear that the estoppel arose from the "structural arguments" made to

distinguish the prior art ion traps, and that the scope of the estoppel was limited to “the structure of the prior art presented”:

The *structural arguments* made by AB/Sciex were for the purpose of patentability and a competitor would reasonably conclude that ion traps would not infringe the claimed mass spectrometer system. However, Micromass has not shown a basis for extending that estoppel beyond the ion trap to include any *non-rod structure*. Nowhere in the reexamination history did AB/Sciex state that the claimed invention applied only to rods and not other structures; it merely *distinguished the structure of the prior art presented*, including ion traps.

Id. at 773-74 (JA578-79) (emphasis added; citation omitted). The Court thus characterized the prior art ion trap structure as a “non-rod set structure,” and ruled that the estoppel did not even extend as far as all “non-rod set structures” much less rod sets that trap ions. *Id.* A “reasonable competitor” having an instrument that has a rod set that traps ions could not conclude from this ruling that such a rod set is excluded from coverage by the “mass filter” limitation of the claims. *See Pharmacia & Upjohn Co. v. Mylan Pharm., Inc.*, 170 F.3d 1373, 1377-78 (Fed. Cir. 1999) (“To determine what subject matter has been relinquished, an objective test is applied, inquiring ‘whether a competitor would reasonably believe that the applicant has surrendered the relevant subject matter.’” (citation omitted)).

Collateral estoppel (issue preclusion) only applies when the identical issue of law or fact was actually litigated and actually decided in a prior action, and the decision of that issue was necessary to the judgment in that action. *In re Freeman*, 30 F.3d 1459, 1465 (Fed. Cir. 1994). The issue raised here is not the same as that decided in the Micromass case. Thermo does not seek to add a limitation to the construction of “mass filter” that excludes just prior art ring-end cap ion traps – which is the scope of the Court’s estoppel ruling. Instead, Thermo seeks to add a limitation that excludes any

structure that “function[s] as an ion trap.” Thermo Br 52. Therefore, issue preclusion does not apply.

L. “Very Low Pressure” and “Substantially Lower Pressure”

'736 Term	Claim	AB/Sciex's Proposal	Thermo's Proposal
“the pressure in said second chamber being a very low pressure for operation of said second rod set as a mass filter”	1	A pressure at which the second rod set will operate as a mass filter.	The pressure in the second chamber is at least below 1×10^{-5} torr.
“a substantially lower pressure than that of said first chamber, for effective mass filter operation of said second rod set”	14	A pressure that is sufficiently lower than that of the first chamber such that the second rod set will operate as a mass filter.	The pressure in the second chamber is at least below 1×10^{-5} torr.

Thermo argues that an upper numerical limit of 1×10^{-5} torr must be imposed on the pressure in the “second chamber” because AB/Sciex purportedly disclaimed higher pressures in distinguishing the Stafford application in the Request for Reexamination. Thermo Br. 58-59. In order for a statement during prosecution to constitute a disclaimer it must be a “clear and unmistakable” disavowal. *Cordis*, 339 F.3d at 1358. A statement is not a “clear and unmistakable” disavowal unless it allows for only one interpretation. *Id.* at 1359 (holding that a prosecution statement did not amount to “a clear and unmistakable” disclaimer because “[t]he statement is amenable to multiple reasonable interpretations”).

Thermo’s interpretation of the argument made in the Request for Reexamination is not the only interpretation. Indeed, Thermo’s interpretation is unreasonable. Thermo does not even quote the entire argument on which it relies on, which distinguishes Stafford based on the “range” of pressures taught, and not on the basis that his lowest value is not “very low”:

Although the Stafford application does disclose the use of a buffer gas at a *range of pressures from 0.01 to 100 millitorr*, the Stafford application does not suggest that a first vacuum chamber have a product of the pressure and length of the first rod set equal to or greater than 2.25×10^{-2} torr cm and *does not disclose or suggest that the second vacuum chamber be operated at a very low pressure*.

JA178-79 (emphasis added). MDS argued that Stafford does not teach a “very low pressure” because Stafford teaches that *every* pressure between 10^{-1} and 10^{-5} torr is okay. But *every* pressure between 10^{-1} and 10^{-5} torr is *not* okay in a mass filter. Thermo’s interpretation of MDS’s argument ignores the words used. It also ignores the fact that the specification cites a pressure two times as high as the upper limit Thermo seeks to impose (2×10^{-5} torr) as an example of “very low” pressure (JA1), and that MDS pointed out many other obvious differences between the claims and Stafford’s ring and end cap ion trap structure. JA177-179. Given these facts, a reasonable competitor would not understand that AB/Sciex had disavowed all pressures above 1×10^{-5} torr. *See Pharmacia & Upjohn*, 170 F.3d at 1377-78.

M. “The Length of Said First Rod Set”

’736 Term	Claims	AB/Sciex’s Proposal	Thermo’s Proposal
“the length of said first rod set”	1, 14	No construction necessary.	The length of the rods in the direction of the longitudinal axis.

Thermo proposes that “the length of said first rod set” means “the length of the rods in the direction of the longitudinal axis.” Thermo Br. 59. AB/Sciex agrees that the length of the rods should be the length measured in the longitudinal direction, that is, the length along the ion path. This definition, however, is implicit in AB/Sciex’s proposed construction for “rod” – “an electrode having a length along an ion path that produces an external electrical field over that length when a voltage is applied.” If the Court accepts

AB/Sciex's construction for "rod," then no construction for "the length of said first rod set" is necessary.

N. "Improved Transmission of Ions Through Said Interchamber Orifice"

'736 Term	Claims	AB/Sciex's Proposal	Thermo's Proposal
"whereby to provide improved transmission of ions through said interchamber orifice."	1, 14	Increased transmission of the ions through the interchamber orifice over that which would occur absent either a product of pressure in the first chamber times length of the first rod set being equal to or greater than 2.25×10^{-2} torr cm, or the kinetic energies of ions entering the first rod set being maintained at a relatively low value.	Transmission of [said] ions that is better than that which would occur at a pressure-times-length value for the first chamber and first rod set below 2.25×10^{-2} torr cm.

AB/Sciex's proposed construction would require that the ion transmission achieved by using the claimed high pressure and low ion kinetic energies must be increased over the ion transmission achieved by not using one or both of them. As AB/Sciex explained in its opening brief, this construction is compelled by the specification of the '736 patent, which teaches that ion transmission is increased by operating the ion guide at an increased pressure *and* maintaining low ion kinetic energies entering the rod set. *See* AB/Sciex Br. 52. The construction is also compelled by the claim language, which expressly links the claimed result of improved ion transmission to the establishment of these two operating parameters. *Id.* at 52-53.

Thermo disagrees with AB/Sciex's proposed construction in two respects. First, Thermo argues that the "plain meaning" of the term "improved" requires the ion transmission to be qualitatively "better," not quantitatively "increased" as set forth in AB/Sciex's proposed construction. Thermo Br. 60. This argument is incorrect. Although Thermo selectively cites dictionary definitions in support of its argument, the primary definition of "improve" in *Webster's Third New International Dictionary* is "to make greater in amount or degree : INCREASE, AUGMENT, ENLARGE, INTENSIFY." B132.

The specification of the '736 patent makes clear that this is how one of ordinary skill would understand the term "improved" in this context, by teaching that the improved ion transmission refers to the increased number of ions that travel through the interchamber orifice for analysis. For example, the inventors state that their invention results in "ion transmission [being] markedly increased." JA16, 1:45-49. They also explain that the sensitivity of the instrument is increased because "more ions are transmitted into" the mass filter chamber. JA22, 14:21-22. They also repeatedly explain that their invention "increases" and "enhances" the ion signal, which is based on the number of ions striking the detector. *See* JA1, abstract; JA18, 5:40-46, 5:67-6:10, 6:29-33, 6:37-39; JA19, 7:10-13; JA20, 10:38-40, 10:47-49; JA21, 11:7-11, 12:13-15; JA22, 13:32-45, 13:51-53. Indeed, Thermo quotes several of these statements about "increased" and "enhanced" ion transmission and ion signal in its brief. Thermo Br. 61.²⁰

The second disagreement concerns Thermo's position that the specification of the '736 patent and the prosecution history require the improved ion transmission to result only from increased pressure, not from the combination of increased pressure and low ion kinetic energies as AB/Sciex contends. This is also incorrect. As AB/Sciex explained in its opening brief, both the specification and the prosecution history are replete with statements that demonstrate that the claimed improved ion transmission results from the combination of increased pressure and low ion kinetic energies. *See* AB/Sciex Br. 52-53.

The specification repeatedly explains that ion transmission is increased by operating the ion guide at an increased pressure (so that the $P \times L$ equals or exceeds 2.25×10^{-2} torr cm) *and* at a low DC voltage to maintain low ion kinetic energies. JA1;

²⁰ This is not to say that improved or enhanced ion transmission cannot be achieved by increasing the *quality* of the ion beam, just that it is not required to do so.

JA16, 1:42-49; JA18, 5:40-46, 5:67-6:10; JA21, 11:7-12, 12:3-15, 12:30-63. Indeed, the inventors explain that at these high pressures, a low DC voltage is necessary to reduce the kinetic energies of the ions and collisionally focus them into a narrower beam:

It is also noted that as mentioned, that *the DC difference voltage* between the AC only rods 32, 32' and the plate through which the ions enter the vacuum chamber 30' (either orifice plate 28 in FIG. 1 or skimmer plate 72 in FIG. 12) *should normally be low at the high pressures used*. If the normal difference voltage of 85 to 95 volts DC is used, the signal enhancement effects disappeared, and in fact the ion signal transmitted to the analyzing quadrupole 40 was drastically reduced. While the reasons for this are not entirely understood, it appears that *a large number of relatively low energy collisions are effective in damping both the radial and axial velocities of the ions and in forcing the ions by collisional damping closer to the centre line of the AC-only rod set 32*. It appears that *more energetic collisions, which occur when the offset voltage is higher*, do not have a similar effect and in fact for some reason *reduce the ion signal*. Further, a high ion energy can lead to collision induced dissociation, resulting in further ion loss. A difference voltage of between 40 and 100 volts between the AC-only rods 32 or 32', and the wall 28 or skimmer 74 tended to shut off the ion signal at pressures of 2.5 millitorr and higher in chamber 30, 30'.

JA21, 12:30-52 (emphasis added).

Thermo ignores the repeated statements in the specification that tie improved ion transmission not only to increased pressure but also to low kinetic energies. Instead, Thermo selectively quotes passages from the specification which it argues confirm that improved ion transmission is due only to increased pressure. Thermo Br. 61-62. However, when those passages are read in context they support AB/Sciex, not Thermo. For example, Thermo cites to column 6, lines 11 to 61 (Thermo Br. 61), but fails to cite to the immediately preceding paragraph, which makes clear that low ion kinetic energies achieved by applying a DC voltage that is low at the pressure used is important to achieving increased ion transmission:

However when the same high pressure experiments were conducted using the AC-only rods 32, *but with the DC difference voltage between the*

orifice plate 28 and the rod set 32 reduced to between about 1 and 30 volts, and preferably between 1 and 10 volts, a much different result occurred. The transmitted ion signal did not drop as the pressure increased as had been expected. Instead the ion signal increased significantly.

JA18, 6:3-10 (emphasis added). Indeed, given the lack of support in the specification for Thermo's position, it is forced to quote passages out of context which in fact support AB/Sciex. For example, Thermo makes the following argument:

Further, the specification speaks of the "markedly increased" transmission, or "a considerable increase in the transmitted ion signal," that results when "the gas pressure in the region of the ion optic elements is increased within certain limits and *when the other operating conditions are appropriately established.*" (See JA16, 18, '736 patent, 1:45-50, 5:40-46.)

Thermo Br. 61 (emphasis added). As the passages from the specification cited by AB/Sciex make clear, the key "other operating condition[]" that must be "appropriately established" is the DC voltage that is low at the pressure of the chamber to achieve low ion kinetic energies that Thermo contends is unimportant.

AB/Sciex's proposed construction is also consistent with MDS's repeated statements during the reexamination that the improved ion transmission of the invention is due to both increased pressure and low ion kinetic energies. For example, MDS stated:

The prior art therefore would not have suggested that the use of both relatively low energy ions and an increased pressure would have the effect of improving ion transmission.

JA174.²¹ As another example, MDS stated:

Further, with the invention, the pressure and kinetic energies of the ions entering the chamber are controlled to improve the transmission of these same ions through an interchamber orifice.

JA181. Many other examples exist.²²

²¹ This passage was cited incorrectly as JA154 in AB/Sciex's opening brief. AB/Sciex Br. 53.

Once again, Thermo ignores the repeated statements in the reexamination prosecution history which tie improved ion transmission not only to increased pressure but also to low kinetic energies. Instead, Thermo selectively quotes passages from the file history which it argues confirm that improved ion transmission is due only to increased pressure. *See* Thermo Br. 62. Once again, however, when those passages are read in context they support AB/Sciex, not Thermo. For example, Thermo states that “in its Request for Reexamination, AB/Sciex stated that ‘[t]he mass spectrometer according to the invention uses an increased pressure to improve ion transmission.’ (JA180.)” *Id.* Thermo fails to mention, however, that the quoted sentence goes on to state “and maintains ‘the kinetic energies of ions moving from said inlet orifice to said first rod set at a relatively low level’ (claim 1).” JA180. Thermo also fails to mention that, in the very next sentence, MDS distinguished the French application on the basis that the improved ion transmission of the invention is due to both increased pressure and low ion kinetic energies:

The French application would therefore teach away from the invention since it collides ions at high kinetic energies into a high pressure region to dissociate the ions into daughter ions, which is in contrast to the invention

²² JA185 (“This use of a high pressure gas and high kinetic energy parent ions to cause fragmentation is in contrast to the invention which maintains the kinetic energy of ions at a relatively low level and uses an increased pressure to improve ion transmission.”); JA186 (“The Finnigan paper does not suggest that increasing the pressure and maintaining the kinetic energy of ions at a relatively low value would lead to improved transmission but asserts would result in a decreased ion current.”); JA187-88 (“Previous mass spectrometers, which employed increased pressures with high kinetic energy parent ions to induce collisions, teach away from the invention which uses an increased pressure and relatively low kinetic energy ions to actually improve ion transmission.”); JA189 (“The invention, on the other hand, maintains the kinetic energy of the ions at a relatively low value and increases the pressure in the chamber to unexpectedly improve the ion transmission through the chamber.”).

which uses low kinetic energy and an increased pressure to produce an improved transmission of ions entering the device.

Id. Thermo also states that “[t]he invention’s approach was contrasted to [sic] ‘the conventional wisdom that the increased pressure would reduce ion current.’ (JA181; *cf.* JA394, ¶ 8.)” Thermo Br. 62. Once again, however, Thermo fails to mention that the rest of the quoted sentence ties the improved ion transmission of the invention to both increased pressure and low kinetic energies:

With the invention, the pressure is increased and the kinetic energies of entering ions are controlled to improve ion transmission, which is opposite to the conventional wisdom that the increased pressure would reduce ion current.

JA181.

In sum, Thermo’s proposed construction of “improved transmission” finds no support in the ordinary meaning of the term “improved,” the specification or the prosecution history. AB/Sciex’s proposed construction, on the other hand, is compelled by the specification and the claim language, is entirely consistent with the prosecution history, and should be adopted by the Court.

II. DISPUTED CLAIM TERMS FOR THERMO’S ’784 PATENT

A. “Mass Analyzer”

’784 Term	Claims	AB/Sciex’s Proposal	Thermo’s Proposal
“mass analyzer”	1, 4	A device that sorts ions according to their mass to charge ratio and detects them.	Any device usable either to deliver ions to another structure selectively, or to detect ions selectively, based on ion mass-to-charge ratios.

Thermo contends that the term “mass analyzer” denotes any device usable to either selectively deliver *or* detect ions. In support of its ambiguous construction, Thermo relies on dictionary definitions (only some of which define “mass analyzer”) and its assertion that “the term ‘mass analyzer’ sometimes refers to a device that does

detection, but other times refers to a device that does no more than deliver ions selectively to another structure.” *See* Thermo Br. 63-64. The problem with Thermo’s ambiguous construction is that the specification of the ’784 patent resolves this ambiguity by using the term “mass analyzer” to refer to an analyzer that detects ions. *See* JA593, Fig. 1, ref. 12 (explicitly labeling a component of the mass analyzer as “DETECTOR”). This usage of the term “mass analyzer” in the specification is “the single best guide to the meaning of [the] disputed term.” *Phillips*, 415 F.3d at 1315 (citation omitted). Thermo’s proposed construction is inconsistent with this usage in the specification and should be rejected.

B. “Adduct Ion(s)”

’784 Term	Claims	AB/Sciex’s Proposal	Thermo’s Proposal
“adduct ion(s)”	1, 4	Ions formed by a non-covalent association between sample ions and solvent molecules.	An ion formed by combining two or more different kinds of particles, usually an ion and a molecule.

Thermo’s broad construction that an adduct ion is one formed by combining any two or more different kinds of particles is based on a generic dictionary definition that is impermissibly “divorced from the context of the written description” of the ’784 patent. *Phillips*, 415 F.3d at 1321. The specification clearly defines “[t]he process of solvent adduction in the mass spectrometer system” as “a non-covalent association between sample ions of interest and neutral solvent molecules.” JA601, 2:39-42. The claim language confirms this definition by reciting “sample ions and solvent molecules form adduct ions” (claim 1) and “some sample ions and solvent molecules combine to form adduct ions” (claim 4). JA604, 7:16, 8:3-4. “[A]fter reading the entire patent,” one of ordinary skill would understand that “adduct ions” are “ions formed by a non-covalent

association between sample ions and solvent molecules.” *Phillips*, 415 F.3d at 1321

(“[T]he ‘ordinary meaning’ of a claim term is its meaning to the ordinary artisan after reading the entire patent.”).

C. “Multipole Ion Guide” and “Ion Lens”

'784 Term	Claim(s)	AB/Sciex's Proposal	Thermo's Proposal
“multipole ion guide”	1, 4	A rod set to which an AC voltage is applied that confines ions radially along a longitudinal path.	A device that confines ions radially and guides them along an extended longitudinal path, as determined by multipolar electric and/or magnetic fields.
“ion lens”	4	An electrostatic device for changing the path of an ion beam.	A device to which one or more voltages are applied so that the device deflects ions and may be used to focus or otherwise to change the shape or direction of an ion beam without continuously confining the ions radially along an extended longitudinal path.

AB/Sciex and Thermo agree that “multipole ion guide” and “ion lens” are two distinct structures employed in a mass spectrometer, but disagree as to how they differ. *See* AB/Sciex Br. 73-74; Thermo Br. 66. Thermo erroneously contends that the key difference is that “in a guide, the ions are confined radially . . . and guided *along an extended pathway*, whereas in a lens the ions are ‘directed’ or ‘focused’ *without* being continuously confined radially *along such a pathway*.” Thermo Br. 66 (emphasis added). Thermo has not provided any support for its contention that an ion guide must provide an extended pathway. Moreover, Thermo’s misguided argument that an ion lens must *not* provide an extended pathway is contrary to a technical reference cited by its own patent.

Thermo’s reliance on two generic dictionary definitions of the term “wave guide” to support its proposed construction that a “multipole ion guide” is “a device that confines ions radially and guides them along an extended longitudinal path” is misplaced. *See id.* Definitions of the term “wave guide” are not relevant to the claim construction of the term “multipole ion guide” because they are two completely different things.

Moreover, Thermo's definitions say nothing about a guide providing an extended pathway.

Thermo also cites one embodiment of the multipole ion guides in the '784 specification, which describes rods "as being 1.25 inches and 3.37 inches long respectively, and as being separated by 0.118 inches." *Id.* at 67 (citing JA602-03, 4:64-5:10). As Thermo itself admonishes "'one example' of the invention . . . cannot be a basis for limiting [a] broad term . . . to that particular embodiment." *Id.* at 68.

In an attempt to support its proposed construction that an ion lens focuses ions "without continuously confining the ions radially along an extended longitudinal path," Thermo ignores the teachings of its own patent. In the "Background of the Invention," the specification states that "U.S. Pat. No. 5,432,343 [(the '343 patent)] (JA682-91)] describes an ion focusing lensing system" and "an electrostatic lens." JA601, 2:17-20. The '343 patent teaches the use of an electrostatic lens to confine ions radially along an extended longitudinal path.²³

In contrast, AB/Sciex's proposed constructions focus on the proper key distinctions between the two devices: a multipole ion guide is an *electrodynamic* device because an AC voltage is applied to produce an oscillatory electric field, whereas an ion lens is an *electrostatic* device because a DC voltage is applied to produce a static electric field.

AB/Sciex's position that a "multipole ion guide" is an electrodynamic device is firmly supported by the specification of the '784 patent, which states that "ions are

²³ JA689, 6:47-52 ("[E]lectrostatic lens 28 has been added to specifically shape the electrostatic field in the second pumping stage 70 to increase ion transmission as indicated by the shaded area 62 through skimmer orifice 32 and on into the mass analyzer through aperture 100." (emphasis added)).

guided by electrodynamic multipole ion guides.” JA601, 1:44. As AB/Sciex explained in its opening brief, this concept is confirmed by prior art references cited in the ’784 patent. *See* AB/Sciex Br. 63 n.19, n. 20. AB/Sciex’s position that an “ion lens” is an electrostatic device is likewise supported by the teachings of the ’784 specification and its cited prior art references. *See id.* at 74.

Thermo’s reliance on U.S. Patent No. 6,504,148 misses the point. *See* Thermo Br. 69. In that patent, the inventors merely described using RF-only rods to “serve as a Brubaker lens.” TA216, 5:29-30 (emphasis added). In other words, while RF-only rods may in some contexts perform the same function as a lens, that does not mean that they *are* a lens. Margarine may substitute for butter in a recipe, but margarine is not butter.

Finally, AB/Sciex’s position that an ion lens is “a . . . device for changing the path of an ion beam” is not restrictive, as Thermo contends. *See* Thermo Br. at 68.

AB/Sciex’s proposed construction properly incorporates the functions of “focusing” and “directing” ions on a path, as disclosed by the specification. *See* JA601, 1:29-33; JA602, 3:17-24.

D. “Means . . . for Increasing the Translational Kinetic Energy of the Adduct Ions”

'784 Term	Claim	AB/Sciex’s Proposal	Thermo’s Proposal
“means associated with one or both of said first and second multipole ion guides for increasing the translational kinetic energy of the adduct ions so that at the vacuum pressure of the second interface chamber adduct ions traveling into the chamber are converted into sample ions without fragmentation of sample	1	<p>The corresponding structure, material, or acts described in the specification is a DC offset voltage between the first multipole ion guide and the immediately preceding lens (ion guide 27 and skimmer 24), or a DC offset voltage between the second ion multipole ion guide and its immediately preceding lens (ion guide 28 and lens 18), or both.</p> <p>No construction required for “associated with one or both of said first and second multipole ion</p>	<p>The corresponding structures described in the specification include a skimmer 24 that precedes the first ion guide 27, a lens 18 located between the first and second ion guides 27 and 28, and their associated voltage sources.</p> <p>“Associated with one or both of said first and second multipole ion guides” means that the “means . . . for increasing” has a relation to</p>

ions”		guides” separate from that set forth above.	either or both of the first and second multipole ion guides.
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Thermo states that the parties agree the function of this means-plus-function limitation is “increasing the translational kinetic energy of the adduct ions so that at the vacuum pressure of the second interface chamber adduct ions traveling into the chamber are converted into sample ions without fragmentation of sample ions.” That is correct as far as it goes. However, Thermo reveals in its brief that it is incorrectly interpreting the meaning of “increasing the translational kinetic energy of the adduct ions.” Thermo states: “In this context, ‘increasing the kinetic energy’ simply means making the ions move ‘downstream’ through the chambers.” Thermo Br. 21. AB/Sciex disagrees with this statement.

Increasing the translational kinetic energy of the adduct ions is not just making them move downstream, because adduct ions already move downstream with the flow of the surrounding neutral gas molecules, not unlike a boat floating down river with the current. *Increasing* the translational kinetic energy of the adduct ions means *adding* translational kinetic energy to them such that their translational kinetic energy is *greater* than the translational kinetic energy of the surrounding gas molecules, like the boat being powered down river and going faster than the current. It is this additional translational kinetic energy of the adduct ions relative to the surrounding gas molecules that produces the collisions between the adduct ions and the gas molecules that, assuming the collisions are energetic enough, will dissociate the adduct ions. That is what “collision induced dissociation” means.²⁴ JA602, 3:32-38; *see also* JA687 (Gulcicek), 2:48-63; JA707, 710

²⁴ The '784 patent does not bother explaining the phenomenon of collision induced dissociation, presumably because the inventors knew that it was so well known at the time they applied for (continued...)

(Whitehouse), 2:32-34, 8:29-37; B150 (Cole); B169 (Kambara); B186-87 (Kato), 5:20-35, 7:1-9.

With regard to the issue of the corresponding structure, Thermo relies on a single sentence fragment in the specification to support its identification of skimmer 24 and lens 18 and their associated voltage sources. *See* Thermo Br. 70-71. This sentence fragment states: “The method comprises applying a DC voltage between the ion lens preceding either the first or the second multipole ion guide to provide translational kinetic energy to the adduct ions.” JA602, 3:50-54 (cited at Thermo Br. 70-71). Thermo misinterprets this language, ignores every other relevant description in the specification that makes clear what the corresponding structure is, and overlooks the fact that the structure it identifies is not even capable of performing the recited function.

The language quoted above refers to the application of a DC voltage “between” elements. The question then is between what and what? The sentence fragment says “between the ion lens preceding either the first or the second multipole ion guide.” There are two ion lenses described in the specification. One of them, skimmer 24, precedes the first multipole ion guide, ion guide 27. The second lens, lens 18, precedes the second multipole ion guide, ion guide 28. So either of skimmer 24 or lens 18 is one element in a pair of elements between which the DC voltage is applied. But what is the other half of the pair? The language does not expressly identify the other half of the pair. It presents a non-grammatical construction. Instead of saying “between A and B,” it says “between A or A' and” One can infer that the inventors meant “between either the lens

their patent in 1999 that it required no explanation. In fact, Douglas and French discuss it in their '736 patent, which was applied for ten years earlier, and it was old then. *See* JA21, 12:23-26.

preceding the first multipole ion guide and the first multipole ion guide, or between the lens preceding the second multipole ion guide and the second multipole ion guide.” That is exactly what every other description of the application of the DC voltages in the specification says, and, when read in the context of the disclosure, this sentence does the same.

Two paragraphs above the sentence fragment on which Thermo relies, the specification states:

A DC voltage source is connected to provide *a potential difference between the first lens and the first multipole ion guide or between interchamber lens and the second multipole ion guide or both* which defines the ion’s translational kinetic energy as it enters the second multipole ion guide.

JA602, 3:27-31 (emphasis added). The following passage is equally if not more explicit:

Although the *offset voltage* which provides the translational kinetic energy to the adduct ions has been described as applied *between the interstage lens and the second multipole ion guide*, it is apparent that the translational kinetic energy can be provided by applying the *DC offset voltage between the skimmer lens and the first multipole stage or by applying voltages simultaneously between each lens and its respective ion guide*.

JA603, 6:50-57 (emphasis added). These passages, which Thermo ignores, make clear that the DC offset voltage is applied between the skimmer and the first ion guide, as a pair, or between the interstage lens and the second multipole ion guide, as a pair, or that voltages are applied between both pairs simultaneously, *i.e.*, “between each lens and its *respective* ion guide.” JA603, 6:56-57 (emphasis added). There is *no* description in the specification of applying a DC voltage between the skimmer and the second ion guide, or between the interstage lens and the first ion guide. Thermo’s argument that “the DC voltage difference (‘offset’) could be between the first lens (element 24) and the second ion guide (element 28)” has no support. *See* Thermo Br. 71.

AB/Sciex's construction simply recites the pairing between elements that the specification explicitly describes: "a DC offset voltage between the first multipole ion guide and the immediately preceding lens (ion guide 27 and skimmer 24), or a DC offset voltage between the second ion multipole ion guide and its immediately preceding lens (ion guide 28 and lens 18), or both." The identification of the "immediately preceding lens" is consistent with the specification. It is also necessary for clarity in view of Thermo's unsupported position that the specification describes applying a DC voltage between the skimmer and the second ion guide.

Oddly, although arguing that "the DC voltage difference ('offset') could be between the first lens (element 24) and the second ion guide (element 28)," Thermo does not even include either ion guide in its proposed identification of the corresponding structure. D.I. 50, Ex. A at 16. Thermo identifies just the lenses and their "associated voltage sources." *Id.* In order for a DC voltage *difference*, or DC offset voltage, to exist it must be relative to another structure, which is at a different voltage, for example, between the skimmer and the first ion guide. Simply having voltage sources for the skimmer and the interstage lens does not produce DC offset voltages between either the skimmer and first ion guide or the interstage lens and second ion guide. Thermo's problem may be that the specification of the '784 patent does not actually show or describe the DC voltage sources for either ion guide. With respect to the '736 patent, Thermo takes the position that no corresponding structure is disclosed for the "means for applying . . . voltage" elements because the voltage sources for the rods are not shown. Thermo Br. 48. Presumably, to avoid inconsistency, Thermo does not identify the ion

guides or the associated DC voltage source as part of the corresponding structure for the “means for increasing the translational kinetic energy” in the ’784 patent.

AB/Sciex does not contend that the lack of description of the DC voltage sources for the ion guides makes the “means for increasing the translational kinetic energy” element indefinite. AB/Sciex’s position is that the specification clearly describes the corresponding structure. It is a DC offset voltage between the first multipole ion guide and the immediately preceding lens (ion guide 27 and skimmer 24), or a DC offset voltage between the second ion multipole ion guide and its immediately preceding lens (ion guide 28 and lens 18), or both. Thermo’s argument that a DC offset voltage cannot be a corresponding structure as a matter of law is incorrect for the reasons previously stated. *See* Thermo Br. 71.

E. “Whereby to Increase the Sample Ion Current and Therefore the Sensitivity of the Mass Spectrometer System” and “To Increase the Sample Ion Current and Therefore the Sensitivity of the Mass Spectrometer System”

’784 Term	Claim	AB/Sciex’s Proposal	Thermo’s Proposal
“whereby to increase the sample ion current and therefore the sensitivity of the mass spectrometer system”	1	The sensitivity of the mass spectrometer system is increased due to an increase in sample ion current entering the mass analyzer that is caused by the <u>conversion</u> of adduct ions into sample ions in the second chamber without fragmentation of sample ions.	The sensitivity of the mass spectrometer system is increased because the flow of sample ions is increased relative to the flow of sample ions in the absence of dissociation of adduct ions at the pressure of the second chamber.
“to increase the sample ion current and therefore the sensitivity of the mass spectrometer system”	4	The sensitivity of the mass spectrometer system is increased due to an increase in sample ion current entering the mass analyzer that is caused by the <u>dissociation</u> of adduct ions in the second chamber without dissociating sample ions.	Same.

AB/Sciex’s use of the terms “conversion” and “dissociation” in its respective proposed constructions merely repeats the use of these different terms in claims 1 and 4.

The jury will not be confused by being given constructions that align with the words used in the claims. There should be no dispute about that.

The real dispute between the parties, however, concerns the causation required by the claim language. The phrases “whereby to increase the sample ion current” and “to increase sample ion current” both show that the increase in sample ion current is the necessary result of the claimed conversion and dissociation of adduct ions into sample ions without fragmentation of sample ions. JA604, 7:32-34, 8:15-17; *Stimsonite Corp. v. Nightline Markers, Inc.*, 33 F. Supp. 2d 703, 709 (N.D. Ill. 1999), *aff’d*, 232 F.3d 908 (Fed. Cir. 2000) (stating that a “whereby” clause states the “requisite consequence” of the limitations of a claim). As such, these phrases mean that the increase in sample ion current entering the mass analyzer is caused by the claimed conversion and dissociation into sample ions, respectively. Additionally, the term “therefore” shows that the increase in sensitivity is caused by the increase in sample ion current entering the mass analyzer. JA604, 7:32-34. Thermo’s proposed construction omits this causation requirement and should be rejected.

F. “Applying a DC Offset Voltage Between a Selected One or Both Lenses and the Succeeding Multipole Ion Guide”

’784 Term	Claim	AB/Sciex’s Proposal	Thermo’s Proposal
“applying a DC offset voltage between a selected one or both lenses and the succeeding multipole ion guide”	4	Applying a DC offset voltage to at least one of the lenses and the ion guide that comes immediately after it.	Supplying DC voltage such that there is a voltage difference between at least one of the lenses and the ion guide that comes after them.

AB/Sciex’s construction, which would require the DC voltage to be applied to at least one of the lenses and ion guide that comes *immediately* after it, is supported by the claims and the specification, as well as by the extrinsic evidence.

First, the claim language recites that a DC offset voltage is applied between “a selected one or both ion lenses and *the* succeeding multipole ion guide.” JA604, 8:10-11 (emphasis added). The use of the term “the” makes clear that the claim is referring to the ion guide that immediately follows the lens(es). *Warner-Lambert Co. v. Apotex Corp.*, 316 F.3d 1348, 1356 (Fed. Cir. 2003) (“It is a rule of law well established that the definite article ‘the’ particularizes the subject which it precedes.” (citations omitted)); AB/Sciex Br. 72.

Second, the specification repeatedly refers to the application of a DC offset voltage between one or both lenses and the ion guide that immediately follows it. *See, e.g.*, JA602, 3:27-30 (“A DC voltage source is connected to provide a potential difference between the *first lens* and the *first multipole ion guide* or between *interchamber lens* and the *second multipole ion guide* or both” (emphasis added)); JA603, 6:50-53 (“[T]he offset voltage . . . has been described as applied between the *interstage lens* and the *second multipole ion guide*, it is apparent that . . . the DC offset voltage [can be applied] between the *skimmer lens* and the *first multipole stage* or by applying voltages simultaneously between each lens and its respective multipole ion guide.” (emphasis added)). Nowhere does the specification state that a DC offset voltage is applied between the second multipole ion guide and the lens that precedes the first multipole ion guide, or disclose how one would do that.

Further, the specification states that when a DC offset voltage is applied at more than one location, it is applied “simultaneously between each lens and its *respective* multipole ion guide.” JA603, 6:56-57 (emphasis added). Thus each lens and the multipole ion guide that immediately follows it become a *pair of structures* – a lens/ion-

guide pair – to which a DC offset voltage is applied. This language thus explains the meaning of “both” in the following passage of the specification: “A DC voltage source is connected to provide a potential difference between the first lens and the first multipole ion guide or between interchamber lens and the second multipole ion guide *or both*.” JA602, 3:27-30 (emphasis added). “Both” refers to both lens/ion-guide pairs, not both lenses.

Thermo improperly relies upon the “plain meaning” of the word “succeeding” to expand the interpretation of the claim limitation beyond its meaning as set forth in the claims and specification. Thermo Br. 73. Extrinsic evidence such as dictionary definitions is “less significant than the intrinsic record in determining ‘the legally operative meaning of claim language.’” *Phillips*, 415 F.3d at 1317 (citations omitted). Thermo, however, does not rely on any intrinsic evidence beyond the conclusory statement that “[t]his language indicates that” the multipole ion guide may succeed both lenses. Thermo Br. 73.

Moreover, the dictionaries cited by Thermo support AB/Sciex’s construction. *Id.* One dictionary defines “succeed” to mean “[t]o come next in time or succession” TA126. Another dictionary defines “succeed” to mean “to be the event or thing *immediately* following on . . . in an ordered sequence or chain of events.” TA169 (emphasis added). That same dictionary also defines “succeed” to mean “to follow or take place after another *esp. in a natural, prescribed, or necessary order, course of events, or development*.” *Id.* (emphasis added).²⁵

²⁵ When citing this definition, Thermo omitted the emphasized portion. See Thermo Br. 73.

G. “A DC Offset Voltage . . . Having an Amplitude So As to Provide Translational Kinetic Energy to Said Adduct Ions . . .”

’784 Term	Claim	AB/Sciex’s Proposal	Thermo’s Proposal
“a DC offset voltage . . . having an amplitude so as to provide translational kinetic energy to said adduct ions to dissociate the adduct ions without dissociating the sample ions at the pressure of the second chamber”	4	The DC offset voltage provides sufficient translational kinetic energy to the adduct ions entering the second chamber to dissociate them without dissociating sample ions at the pressure of the second chamber.	One or more DC offset voltages provides translational kinetic energy such that, at the vacuum pressure of the second chamber, adduct ions that have entered the second chamber are broken up to form additional sample ions without fragmentation of sample ions.

Thermo makes no argument in support of its proposed construction other than an attempt to support the phrase “*one or more* DC offset voltages.” Although the phrase “a DC offset voltage” would mean “one or more DC offset voltages” under the established rule of construction relating to the use of the indefinite article “a,” in the context of the other language of this element, the phrase is more limited. The element states: “applying a DC offset voltage between a selected one or both lenses and the succeeding multipole ion guide.” The preamble of the claim provides the antecedent for this phrase. The preamble identifies “first and second multipole ions guides disposed in serial first and second evacuated chambers separated by an ion lens . . . and an ion lens for defining the first evacuated chamber.” Thus, a DC offset voltage is applied between a selected one of (1) “an ion lens for defining the first evacuated chamber” and the first multipole ion guide, or (2) “an ion lens” that separates the “serial first and second evacuated chambers” and the second multipole ion guide, or both (1) and (2). Thermo acknowledges that the claim recites “*one or both* lenses and the succeeding multipole ion guide,” yet concludes illogically that “one or more DC offset voltages may be used.” *See* Thermo Br. 74.

Thermo criticizes AB/Sciex's construction as suggesting that "there is only one DC voltage at issue." *Id.* The reference to "the DC offset voltage" in AB/Sciex's construction must be read in conjunction with the antecedent provided by AB/Sciex's separate construction of "applying a DC offset voltage between a selected one or both lenses and the succeeding multipole ion guide." AB/Sciex's construction of this part of the element, specifically, "applying a DC offset voltage to at least one of the lenses and the ion guide that comes immediately after it," encompasses applying either or both of the DC offset voltages discussed above. Thus, "the DC offset voltage" refers to whichever DC offset voltage is applied, whether it is one of them or both of them.

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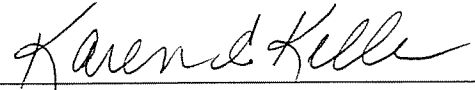
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CONCLUSION

For the foregoing reasons and for the reasons set forth in AB/Sciex's opening brief, AB/Sciex respectfully requests that the Court confirm and adopt the Court's prior constructions of the terms in the '736 patent in the Micromass case, adopt AB/Sciex's proposed constructions of the disputed claim terms in the '736 and '784 patents, and reject Thermo's contrary constructions.

Dated: December 15, 2005

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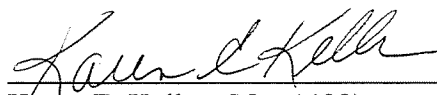
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